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Abstract

EDF 2, EDF 3 AND EDF 4 NUCLEAR POWER STATIONS

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In this report, the authors describe the three natural uranium-graphite-CO_2 power stations now being built by Electricité de France.

The authors place particular stress on the evolution of their characteristics and the principal equipment employed.

The electrical output has risen from about 200 MW for EDF 2 to 480 MW for EDF 3 and EDF 4. The electrical power produced per ton of uranium has increased from 910 kW for EDF 2 to 1170 kW for EDF 3 and EDF 4. Simultaneously, the temperatures of the gases and the cans have risen and efficiencies have increased.

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This evolution has been made possible, thanks to the progress achieved in fuel elements and power station equipment. EDF 2's metal pressure-vessel, consisting of a sphere about eighteen metres in diameter rated at 28 bars, has been replaced in subsequent power stations by prestressed concrete structures.

To step up the unit powers of the blowers (from 6 to 15 MW), they are now driven by turbines instead of electric motors.

The fuel loading devices, the heat exchangers and the burst slug detection systems have also developed considerably from one power station to the next.

EDF 4 is Electricité de France's first "integrated" power station, with its heat exchanger located in the prestressed concrete pressure-vessel, beneath the reactor. This new arrangement has called for corresponding new internal layout, and certain equipment had to be adpated. However, the designers have striven to keep the other equipment as similar as possible to that developed for EDF 3, as is the case for the core design, the fuel elements, the loading equipment and the turbo-generator sets.